IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

WOLLASTON et al — Atty. Ref.: 540-318

Serial No. (Cont. of 09/212,569) — Group:

Filed: August 9, 2001 — Examiner:

For: FRICTION WELDING METAL COMPONENTS

* * * * * * * * * * *

August 9, 2001

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Please amend the above-identified application as follows:

IN THE SPECIFICATION

Page 1, between the title and line 1, insert the following paragraph(s):

--BACKGROUND OF THE INVENTION

This application is a continuation of Application No. 09/212,569, filed December 16, 1998, which is a continuation of PCT/GB98/01650 filed June 22, 1998, the entire content of which are hereby incorporated by reference in this application.

1. Field of the Invention--.

Page 1, between line 5 and 6, insert the following subheading:

--2. Discussion of Prior Art--.

Page 3, between lines 7 and 8, insert the following heading:

--BRIEF DESCRIPTION OF THE DRAWINGS--.

Page 15, replace the paragraph beginning at line 12, with the following rewritten paragraph/s:

--DETAILED DISCUSSION OF PREFERRED EMBODIMENTS

Figure 1 shows skin panels 1, 2 friction stir butt welded together at 3 and having a stringer 4 bolted to the skin panels 1, 2 either side of the weld 3. A secondary load path is thus provided and the need for a butt strap removed.--

Page 15, replace the paragraph beginning at line 16, with the following rewritten paragraph:

--In Figures 2, 3 and 4 alternative structural assemblies for a wing skin or fuselage skin stiffened assembly are shown. Extruded panel stiffener members 5, 6 in Figure 2 are shown friction stir butt welded together at 3 with a butt strap 7 bolted in position to members 5 and 6 either side of the weld 3. Again by this means it will be seen that a secondary load path is provided.--

Page 16, replace the paragraph beginning at line 8 with the following rewritten paragraph:

--Figure 5A, B and C show alternative methods of attaching stiffeners to panel members. In Figure 5A extrusion 12 has a stiffening portion 13, friction stir butt welded to it at 3. In Figure 5B a friction stir butt weld 3 connects together two panel members 1,

2 and also a T-shaped stiffener member 14. It will be observed that the weld 3 occupies the entire space between members 1, 2 and 14. In Figure 5C an alternative arrangement to that of Figure 5B is shown with a T-shaped stiffener 15 extending between panel members 1 and 2.--

Page 19, replace the paragraph beginning at line 6 with the following rewritten paragraph:

--In Figure 12 part of a wing spar 35 is shown friction stir butt welded at 36 to an angled skin portion 37 which is in turn friction stir butt welded at 38 to a skin panel member 39. A separate rib post 40 is fastened in position to spar 35 and angled portion 37. This example teaches how a construction according to the invention works to the designers advantage in designing a complex structural joint assembly. In this example the portion of spar 35 shown comprises 7000 series aluminium alloy, the angled portion 37 comprises 2000 series aluminium alloy and the skin portion 39 comprises 2000 series aluminium alloy.--

IN THE CLAIMS

Please cancel claims 2-12, 15, 17, 19, 21-31 and 34-36 without prejudice.

REMARKS

In view of the cancellation of claims noted above, claims 1, 13, 14, 16, 18, 20, 32, 33 and 37-39 remain in this application.

Attached hereto is a marked-up version of the changes made to the specification by the current amendment. The attached page/s is/are captioned "**Version With Markings To Show Changes Made**."

It is respectfully requested that the above preliminary amendment be entered prior to examination of the claims on the merits. These amendments add headings and subheadings in accordance with U.S. patent practice. Additionally, a number of minor modifications of claim and specification language have been made. A proposed drawing correction is also submitted for approval.

Having responded to a number of errors noted with respect to the originally filed application, it is submitted that pending claims 1, 13, 14, 16, 18, 20, 32, 33 and 37-39 are in condition for allowance and notice to that effect is respectfully solicited. In the event the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of these claims, the Examiner is respectfully requested to contact applicant's undersigned representative.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____
Stanley C. Spooner
Reg. No. 27,393

SCS:kmm
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Page 1, between the title and line 1, insert the following paragraph(s):

BACKGROUND OF THE INVENTION

This application is a continuation of Application No. 09/212,569, filed December 16, 1998, which is a continuation of PCT/GB98/01650 filed June 22, 1998, the entire content of which are hereby incorporated by reference in this application.

1. Field of the Invention

Page 1, between line 5 and 6, insert the following subheading:

2. Discussion of Prior Art

Page 3, between lines 7 and 8, insert the following heading:

BRIEF DESCRIPTION OF THE DRAWINGS

Page 15, the paragraph beginning at line 12:

DETAILED DISCUSSION OF PREFERRED EMBODIMENTS

Figure 1 shows [wing] skin panels 1, 2 friction stir butt welded together at 3 and having a stringer 4 bolted to the skin panels 1, 2 either side of the weld 3. A secondary load path is thus provided and the need for a butt strap removed.

Page 15, the paragraph beginning at line 16:

In Figures 2, 3 and 4 alternative structural assemblies for a wing skin or fuselage skin stiffened assembly are shown. Extruded panel stiffener [assemblies] members 5, 6 in Figure 2 are shown friction stir butt welded together at 3 with a butt strap 7 bolted in position to members 5 and 6 either side of the weld 3. Again by this means it will be seen that a secondary load path is provided.

Page 16, the paragraph beginning at line 8:

Figure 5A, B and C show alternative methods of attaching stiffeners to panel members. In Figure 5A extrusion 12 has a stiffening portion 13, friction stir butt welded to it at 3. In Figure 5B a friction stir butt weld 3 connects together two panel members 1, 2 and also a T-shaped stiffener member 14. It will be observed that the weld 3 occupies the entire space between members 1, 2 and 14. In Figure 5C an alternative arrangement to that of Figure 5B is shown with a T-shaped stiffener 15 extending between panel members 1 and 2.

Page 19, the paragraph beginning at line 6:

In Figure 12 part of a wing spar 35 is shown friction stir butt welded at 36 to an angled skin portion 37 which is in turn friction stir butt welded at 38 to a skin panel member 39. A separate rib post 40 is fastened in position to [members] spar 35 and angled portion 37. This example teaches how a construction according to the invention works to the designers advantage in designing a complex structural joint assembly. In this example the portion of spar 35 shown comprises 7000 series aluminium alloy, the

angled portion 37 comprises 2000 series aluminium alloy and the skin portion 39 comprises 2000 series aluminium alloy.

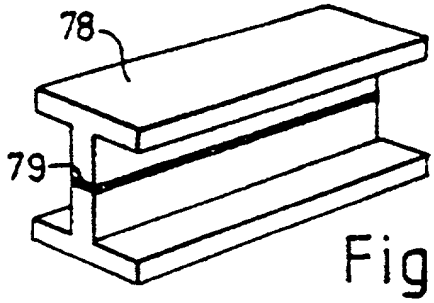

Fig. 28

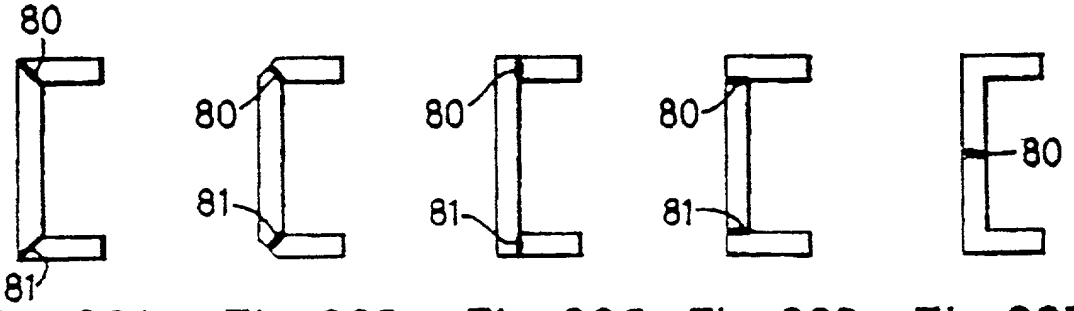

Fig.29A Fig.29B Fig.29C Fig.29D Fig.29E

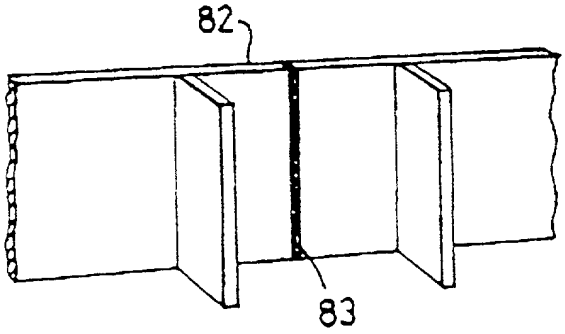

Fig. 30

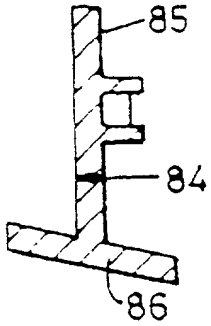

Fig. 31

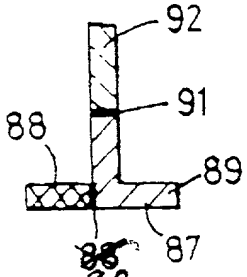

Fig. 32

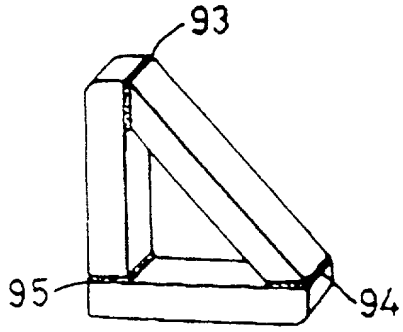

Fig. 33

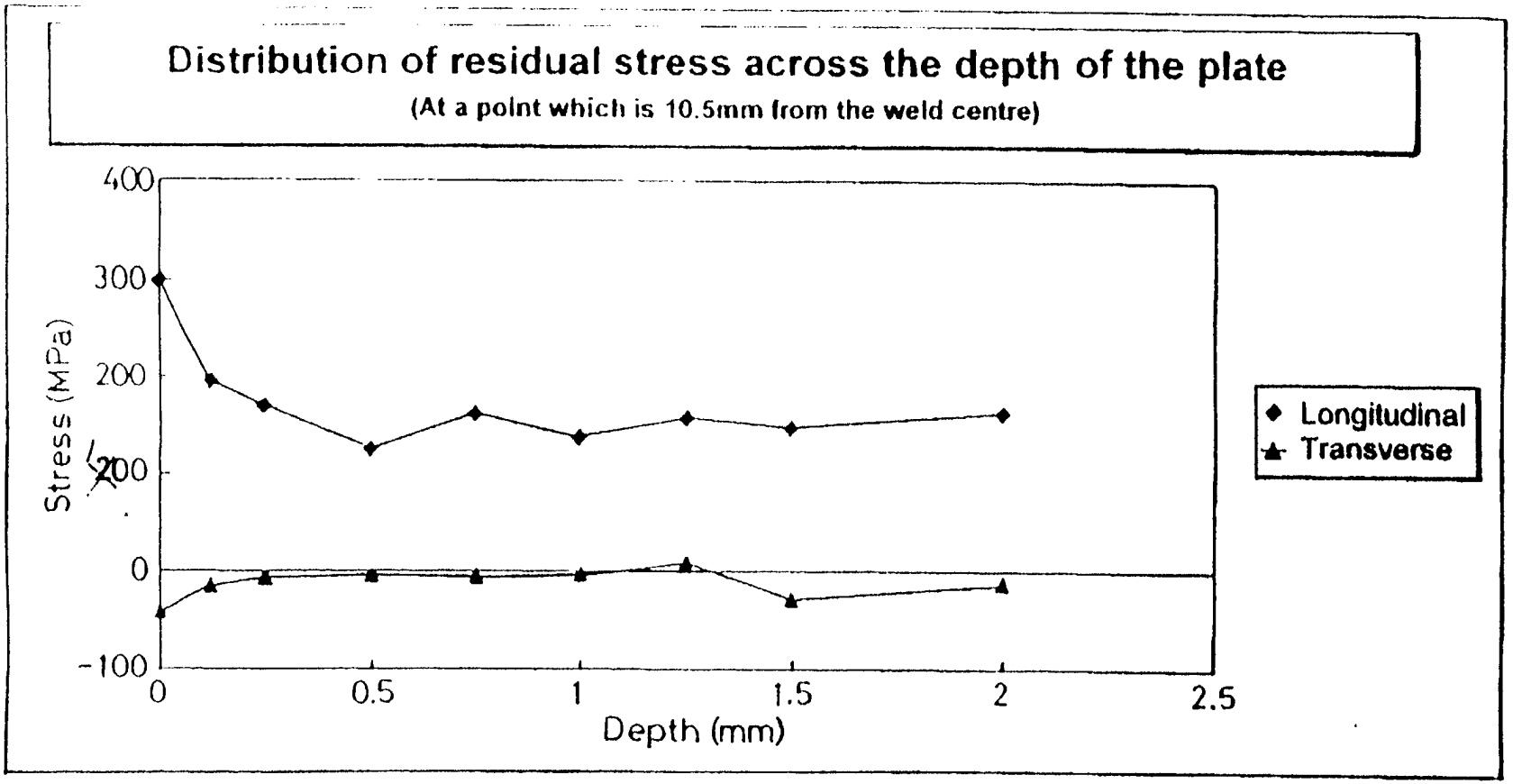
Distribution of residual stress across the depth of the plate
(At a point which is 10.5mm from the weld centre)
Stress (MPa)
400
300
200
0
-100
0
0.5
1
1.5
2
2.5
Depth (mm)
Longitudinal
Transverse

Fig. 40